Report of the Wind Scheduling Group

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We focused on two items during the 2/27/03 meeting.

1. The costs of integrating wind into the NW power system, and
2. Where do we go from here on the question of scheduling and penalties?

Integrating Wind

Lon Peters, Rod Noteboom, and Steve Kearns spoke from a discussion paper, "Integrating Wind into the NW Power System." The key points of the discussion paper are paraphrased below[1]:

- The unique characteristics of wind place demands on control areas that are different from other resources.
- The differences all stem from the fact that wind out put is not as predictable as other resources, and other resources have to respond to this unpredictability.
- Wind resources or the holder of the transmission contract should pay all cost that they impose on the system, just like other resources do.
- One idea put forth is that wind resources should also pay a charge similar to variable loads of PF customers. This load variance (LV) charge is a premium charge that allows PF customers to sell back power to BPA at the PF rate when loads fall below estimates and to buy power at the PF rate when loads are higher than estimated.

The discussion paper also comments on other alternatives to integrating wind. In general, the authors see the approach taken by California ISO and Eric Hirst as flawed, because they do not consider the marginal costs imposed by wind on the control area. Just because an off setting fluctuation in loads or other generators "covers" for winds imbalances doesn't mean that wind (or any other resource) should not pay for its entire imbalance.

Ken Dragoon of PacifiCorp presented the results of his work on the cost of integrating wind into PacifiCorp's system. He compared the costs of integrating various quantities of wind and compared those costs to the cost of integrating a flat resource. The difference in costs is the costs imposed by the variability of wind output. All costs, including incremental reserve requirements and system imbalance costs were included. Henwood's PROSYM model was used to simulate the costs of the two alternatives.

Ken's finding include:

- Imbalance costs increase with the installed capacity of wind.
- Reserve requirements increase with the installed wind capacity.

[1] The paper appears in its entirety on the wind scheduling work groups website.

- Total costs of integrating wind relative to the flat resource were estimated to range from $3.26/MWh to $5.97/MWh as wind increases from 500 MW to 1,000 MW in the east side of the system, and from $3.49/MWh to $4.99/MWh in the west side of the system.
- In summary, there is strong evidence that wind integration issues and costs are manageable for significant amount of wind on PacifiCorp's system. PacifiCorp may be able to accommodate as much as 20% of its resources in wind at costs in the $5-$6/MWh range.

Ken listed a number of caveats to his estimate. (The presentation is on the wind scheduling group's web site.)

Eliot Mainzer BPA/PBL and Warren McReynolds BPA/TBL discussed the Eric Hirst model that was used in a recent report to estimate BPA's costs of integrating wind resources. That report used only a few months of data from the Stateline project to come up with costs estimates. Hirst found that the costs of integrating wind appeared to be very low.

Mainzer described the work he and others at BPA are doing to add additional wind data to the Hirst model, and to review the value of the model in capturing all known costs of integrating wind. He separated the opportunity costs wind and other resources impose on PBL from the integration costs imposed on TBL.

McReynolds does not at this time endorse the Hirst model, because he sees it as only one data point, and that a lot of work is still left to be done. TBL can easily integrate the current level of wind resources, but at higher levels he is not sure. TBL has received integration requests from wind developers considering up to 5,000 MW's of wind. Two sites with up to 1,300 MW are near the John Day dam. At these levels he is concerned. One thing that would help according to Warren is a better incentive for wind resources to continue improving their forecasts of output. (The current 90/110 rule acts as an incentive for wind producers to under forecast, in order to avoid the 110% charge for being outside the dead band on the low side.)

Eliot Mainzer encouraged anyone in the group to contact him to follow and/or contribute to the work that he and others are doing. We will have a report on progress at the next meeting.

Scheduling wind resources and related penalties.

As we all remember scheduling and settlements were to main objectives of this group. We got a little sidetracked on the cost of integrating wind, but it was important to get opposing views on the table, in order to move forward. The advocates of settlements and penalties rule modifications agreed in the meeting to bring a modified approach back to the work group at its next meeting, hopefully sometime towards the end of the third week in March. That group will examine the relationship between forecasting accuracy and incentives to make them better, penalties, and settlements.